***CLASS COPY – DO NOT WRITE ON THIS***

CW 27: Exponential Functions Day 1

**Honors Geometry**

**The King’s Chessboard**

According to the legends of Mr. Madonna, many many years ago a wise man created the first ever chessboard for the king. As his reward, the wise man requests two grain of rice for the first square on the chessboard, four grains of rice for the second square, eight grains of rice for the next square, and so on, for all 64 squares on the chessboard. How many grains of rice will the wise man receive on the 64th day?

**Functions as Sequences.** Identify the pattern for each of the sequences. What differences do you notice between the sequences?

1. 14, 21, 28, 35 . . . .
2. 4, 40, 400, 4000 . . .
3. . . .
4. . . .
5. Graph the following functions. What do they tell you about the functions?

**Function A Function B**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 |
|  | 1 | 3 | 5 | 7 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 |
|  | 1 | 3 | 9 | 27 |

**Graphing Exponential Functions**.

What do you notice about the functions in 6 – 9? What do the functions have in common? What are the differences you see?

1. Two equipment rental companies have different penalty policies for returning a piece of equipment late. Company 1: On day 𝟏, the penalty is $𝟓. On day 𝟐, the penalty is $𝟏𝟎. On day 𝟑, the penalty is $𝟏𝟓. On day 𝟒, the penalty is $𝟐𝟎, and so on, increasing by $𝟓 each day the equipment is late.

Company 2: On day 𝟏, the penalty is $𝟎. 𝟎𝟏. On day 𝟐, the penalty is $𝟎. 𝟎𝟐. On day 𝟑, the penalty is $𝟎. 𝟎𝟒. On day 𝟒, the penalty is $𝟎. 𝟎𝟖, and so on, doubling in amount each additional day late. Jim rented a digger from Company 2 because he thought it had the better late return policy. The job he was doing with the digger took longer than he expected, but it did not concern him because the late penalty seemed so reasonable. When he returned the digger 𝟏𝟓 days late, he was shocked by the penalty fee.

What did he pay, and what would he have paid if he had used Company 1 instead?